

~~Step A~~ SPLIT PERSONAL COMPUTER SYSTEM~~Step B~~ ~~D1~~ CROSS REFERENCE TO RELATED APPLICATIONS~~Step B~~ ~~D1~~ Not applicable.STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

5 Not applicable.

BACKGROUND OF THE INVENTION

Many people currently use several computers in the execution of their job duties. For example, an individual may have one computer located at work, another computer located in an office at home, and yet another computer which is portable to use when the individual is neither at work nor at home. The quickly changing technology in the computer area constantly requires consumers to upgrade their computer systems to meet their demands. This means that the individual must separately upgrade the software and hardware on each of the office computer, the home computer and the portable computer. To upgrade all three computers requires three separate software licenses and hardware items which are costly.

20 Communications software for personal computers, such as pcAnywhere obtainable from Symantec Corporation are currently available. These 25 communication software packages permit an individual to control a first computer from a second computer over phone lines.

Large communication networks are currently in use for providing cable television and telephone services to remote locations, such as homes, offices and hotel rooms. In addition, another large network known as the "internet" is being used to permit 30

remote computers to communicate with each other. Cable television companies have recently been interfacing the cable television networks to the telephone and internet networks to provide access to all three networks through the cable television connection provided in a large number of homes.

The companies are working to bring simpler and lower cost internet access to hundreds of millions of households by combining low cost cable television desk top controls with the phone system and a keyboard. This combination of elements and new products will allow users to access the internet and perform interactive tasks such as: a) e-mail; b) database searches; and c) interactive games and advertising.

Time share computer systems have been used for many years. With conventional time share systems, individuals could connect to a central computer from a so-called "dumb" terminal and purchase time on a shared computer system. The dumb terminal communicated with the shared computer system via either phone line or hard wire remote terminal lines. The time share systems have largely been replaced by a personal computer, or a local area network (LAN) system which connects a large number of personal computers together so that resources can be shared.

However, these new systems and networks do not address the problems facing computer users which are: 1) fast obsolescence of personal computer models and operating systems; 2) increasing demand for more memory and speed; 3) constant upgrades of software programs; and 4) need for computer portability by more and more people. It is to such an improved

split personal computer system that the present invention is directed. The system of the present invention can be implemented by utilizing a programming language called JAVA, which was developed by Sun Microsystems, Inc. The JAVA language is ideally suited to allow communication between the Graphical User Interface (GUI) requirements of a local portion of the split personal computer system and the remote portion of the split personal computer system. The remote portion of the split personal computer system can operate C++ language application programs.

SUMMARY OF THE INVENTION

The present invention relates to a split personal computer system including a remote portion and at least one local portion which is disposed remotely from the remote portion. The remote portion of the split personal computer system is adapted to perform the heavy computational and storage portions of the personal computer tasks, and the local portion of the split personal computer system is adapted to solely perform the video and the input/output portions of the personal computer tasks so that an individual manipulating the local portion of the split personal computer system is provided with the illusion of utilizing a complete personal computer system.

The remote portion of the split personal computer system includes at least one remote computer unit.

In one embodiment of the present invention, the local portion of the split personal computer system

includes a television display unit, a television accessory unit in communication with the television display unit, and an input unit located in close proximity to the television display unit and in communication with the television accessory unit to input data signals into the television accessory unit. The television display unit selectively displays television signals output by the television accessory unit in a format perceivable by an individual located near the television display unit.

The system is also provided with a communication means for interfacing the television accessory unit of the local portion of the split personal computer system with the remote computer unit of the remote portion of the split personal computer system for permitting data signals received by the television accessory unit from the input unit to be transmittable from the television accessory unit to the remote computer unit. The received data signals are processable by the remote computer unit to generate output signals. The output signals are transmittable from the remote computer unit to the television accessory unit, and then transmittable from the television accessory unit to the television display unit as television signals whereby the input unit is capable of functioning as an input unit for the remote computer unit and the television display unit is capable of functioning as a monitor for the remote computer unit to provide the illusion of a complete computer system from the point of view of the individual located adjacent the television display unit.

One advantage of the present invention is that it permits the individual to operate the remote portion of the split personal computer system, for example, utilizing only the television display unit, the television accessory unit and the input unit.

Because television display units are already provided in a large number of locations, such as homes and hotel rooms, the individual need only obtain the television accessory unit and the input unit to remotely operate the remote portion of the split personal computer system.

In one embodiment of the present invention, the remote portion of the split personal computer system communicates with the television accessory unit of the local portion of the split personal computer system over an internet network. The internet network can be interfaced with a cable television network so that internet access is provided from the cable television connection currently provided in homes, hotels and businesses. The television accessory unit can be included in a cable television interface box interconnecting the television display unit to the cable television connection.

In yet a further embodiment of the present invention, the television accessory unit can be provided in a portable housing. The advantage of the portable housing is that the individual can transport the television accessory unit from one location to another location to remotely operate the remote portion of the split personal computer system with different television display units.

In yet another embodiment of the present invention, the remote computer unit of the remote

portion of the split personal computer system can be provided as a plurality of networked computers which are controlled by a remote system controller. In this embodiment, a plurality of local portions of the split personal computer system are contemplated with each of the local portions of the split personal computer system being disposed remotely from the remote portion of the split personal computer system, and remotely from the other local portions of the split personal computer system. For example, each of the local portions of the split personal computer system could be provided in an individual's home or hotel room or any other location commonly including or adapted to receive a television display unit. The remote system controller can be provided with a billing program which counts the number of minutes that respective local portions of the split personal computer system are operating at least one of the networked computers of the remote portion of the split personal computer system. By employing the remote system controller and the billing program, individuals can "rent" computer time from the remote portion of the split personal computer system and obtain the benefits of a centralized management team upgrading the application software and the hardware on the remote portion of the split personal computer system.

Other objects, features and advantages of the present invention are apparent from the following detailed description when read in conjunction with the attached drawings and appended claims.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE  
DRAWINGS

Figure 1 is a schematic, diagrammatic view of a split personal computer system constructed in accordance with the present invention which includes a local portion of the split personal computer system communicating with a remote portion of the split personal computer system.

10       Figure 2 is a schematic, diagrammatic view of one preferred embodiment of the local portion of the split personal computer system in which a television display unit is used as a monitor and a television accessory unit is provided to communicate with the remote portion of the split personal computer system and the television display unit.

15       Figure 3 is a schematic, diagrammatic view of the remote portion of the split personal computer system.

20       Figure 4 is a front elevational view of the television accessory unit disposed on the television display unit.

DETAILED DESCRIPTION OF THE INVENTION

25       The terms "internet" and/or "communication link", as used herein, refer to any suitable communication link which permits electronic communications, such as extra computer communication systems, intra computer communication systems, internal buses, local area networks, wide area networks, point to point shared and dedicated communications, infra red links, microwave links, telephone links, cable TV links, satellite links, radio links, fiber optic links, cable links and/or

any other suitable communication system. It should be understood that each of the communication links are shown and described separately herein for the sole purpose of clearly illustrating the information being communicated between the various components.

5 The communication links may not be separate communication links but may be a single physical communication link.

10 Referring now to the drawings and more particularly to Figure 1, shown therein and designated by the general reference numeral 10 is one embodiment of a split personal computer system constructed in accordance with the present invention.

15 The split personal computer system 10 includes a plurality of local portions 12 disposed remotely with respect to each other. Only two local portions 12 of the split personal computer system 10 are shown and designated by the general reference numerals 12a and 12b in Figure 1 for purposes of clarity. The local

20 portions 12a and 12b of the split personal computer system 10 can be located in homes, hotel rooms, or any other suitable location and can be adapted to solely perform the video and the input/output portions of the personal computer tasks so that an individual manipulating one of the local portions 12 of the split personal computer system 10 is provided with the illusion of utilizing a complete personal computer system.

25 The local portions 12a and 12b of the split personal computer system 10 communicate with a telephone network controller 14 via respective communication links 16a and 16b, and a television network controller 18 via respective communication

links 20a and 20b. The telephone network controller 14 can be any type of bidirectional communication system, such as a direct phone line using a 1-800 line or the internet. The television network controller 18 can be any type of high-bandwidth communication system which permits at least unidirectional communications and possibly bi-directional communications. For example, the telephone network controller 14 and the television network controller 18 can be switches owned by the telephone and cable television companies, respectively, located in the same or different regions as the local portions 12a and 12b of the split personal computer system 10.

The split personal computer system 10 also includes at least one remote portion 22 disposed remotely with respect to the local portions 12a and 12b of the split personal computer system 10. In essence, the remote portion 22 of the split personal computer system 10 is adapted to perform the heavy computational and storage functions of the personal computer tasks of the split personal computer system 10. The remote portion 22 of the split personal computer system 10 is provided with a plurality of remote computer units 24 networked and controlled by a remote system controller 26. Only two of the remote computer units are shown in Figure 1 and designated by the reference numerals 24a and 24b for purposes of clarity. The remote computer units 24a and 24b can be any suitable computers which are capable of communicating with another computer located remotely with respect to such remote computer units 24a and 24b. The remote computer units 24 can

be located at an individual's office, home, or any other suitable location. Application programs are typically stored on the remote computer units 24 and the data associated with previous usage by the  
5 individual are stored on the remote computer units 24 so that such application programs and data are accessible by the local portion 12a and 12b of the split personal computer system 10, as will be discussed below.

10       The remote system controller 26 communicates with the telephone network controller 14 and the television network controller 18 via respective communication links 27a and 27b and also communicates with the remote computer units 24a and 24b via  
15       respective communication links 28a and 28b. The remote system controller 26 can be any type of computer or controller which is capable of receiving signals transmitted from at least one local portion 12 of the split personal computer system 10 and supplying such signals to at least one of the remote computer units 24 to permit bidirectional communication therebetween.

20       For example, the remote system controller 26 can be a network control computer which stores a list of access codes for individuals authorized to use the remote computer units 24. The remote system controller 26 can also include a billing program which counts the time periods in which an individual utilizes at least one of the remote computer units 24 so that either session billings (in the case of hotel rooms billings, for example) or monthly billings could be made. The time periods can be measured in seconds, minutes or any other suitable unit of time.  
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The local portions 12a and 12b of the split personal computer system 10 are substantially identical in construction and function. Thus, only the local portion 12a of the split personal computer system 10 will be described herein in detail for purposes of clarity.

As shown in Figure 2, the local portion 12a of the split personal computer system 10 is provided with a television display unit 30, a television accessory unit 32 (shown in dashed lines), an input unit 34, an output unit 36 and a telephone 38.

The television display unit 30 can be any suitable television set or other display device, such as a computer monitor which is capable of receiving television or other video signals from the television accessory unit 32 via a communication link 40 and outputting signals in a format perceivable by an individual located adjacent the television set. The term "television signals" as used herein can mean signals adapted to be displayed by a television set, or any other type of suitable video and/or audio signals.

The input unit 34 can be a mouse, a keyboard, a scanner, a video wand, a remote control or any other suitable input unit. The input unit 34 is located adjacent the television display unit 30 and in communication with the television accessory unit 32 via a communication link 42 to input data signals into the television accessory unit 32.

The output unit 36 receives data signals from the television accessory unit 32 via a communication link 44 to provide an output signal in hardcopy or other tangible or intangible formats. The output

unit 36 can be any type of output unit capable of receiving signals from the television accessory unit 32, such as a printer, a plotter, a local hard drive or a floppy disk.

5       The telephone 38 bidirectionally communicates with the television accessory unit 32 via a communication link 46. The telephone 38 can be any type of telephone or other suitable bidirectional communication system.

10      The television accessory unit 32 includes a television interface 50, a local computer 52 and a signal separator interface 54. Each of the television interface 50, local computer 52 and signal separator interface 54 can be located within a single portable housing 55 (Figure 4) which is adapted to be disposed adjacent the television display unit 30, or can be provided as components included in the television display unit 30. The advantage of the portable housing 55 is that the individual can transport the television accessory unit 32 from one location to another location to remotely operate the remote portion 22 of the split personal computer system 10 with different television display units 30.

15      The local computer 52 can be any type of suitable computer and desirably includes temporary and permanent storage devices, and an operating system loaded thereon. The operating system can include the display and input/output portions of Windows 95, Windows 3.1, Macintosh, OS/2, NT95 or any other suitable operating system.

20      The signal separator interface 54 communicates with the telephone network controller 14 and the television network controller 18 via the

communication links 16a and 20a. The signal separator interface 54 serves to route signals received thereby to the proper entity to process such signals. For example, two types of television signals can be received from the television network controller 18: those originally transmitted by the remote portion 22 of the split personal computer system 10 and those originally transmitted by a television station block 57 (Figure 1). The signals originally transmitted by the remote portion 22 of the split personal computer system 10 are forwarded by the signal separator interface 54 to the local computer 52, and the signals originally transmitted by the television station block 57 are forwarded by the signal separator interface 54 to the television interface 50. The television station block 57 can be any television station which transmits audio and/or video signals which can be displayed or otherwise output by the television display unit 30. A header or other identifier can be included in the signals originally transmitted by the remote portion 22 of the split personal computer system 10 so that the signal separator interface 54 can distinguish between the signals originating from the remote portion 22 of the split personal computer system 10 and the television station block 57.

In addition, at least two types of signals can be received by the signal separator interface 54 from the telephone network controller 14: those originating from the remote portion 22 of the split personal computer system 10 and those not originating from the remote portion 22 of the split personal computer system 10. Those signals received by the

signal separator interface 54 from the communication link 16a which are originated from the remote portion 22 of the split personal computer system 10 are transmitted to the local computer 52; and those signals which do not originate from the remote portion 22 of the split personal computer system 10 are transmitted to the telephone 38 via the communication link 46, for a purpose to be described hereinafter. A header or other identifier can be included in the signals originally transmitted by the remote portion 22 of the split personal computer system 10 so that the signal separator interface can distinguish between the signals originating from the remote portion 22 of the split personal computer system 10 and those not originating from the remote portion 22 of the split personal computer system 10.

The input unit 34 provides signals to the signal separator interface 54 over the communication link 42. Included in the signals provided to the signal separator interface 54, are three different categories of signals. The input unit 34 may include a header or other identifier in the signals it provides to the signal separator interface 54 so that the signal separator interface 54 can distinguish between the three different categories of signals.

The first category of signals are those which control the television display unit 30. Upon receipt of a signal in the first category, the signal separator interface 44 forwards such signals to the television interface 50 via a communication link 56. The television interface 50 then forwards such first category signals to the television display unit 30 so that the television display unit 30 will receive such

first category signals and respond accordingly. First category signals include those signals which change the channel or volume of the television display unit 30, for example. Before the television accessory unit 32 can be utilized to access the remote portion 22 of the split personal computer system 10, an individual located adjacent the television display unit 20 operates the input unit 34 to tune the television display unit 20 to a suitable channel to receive television signals from the television accessory unit 32 via a communication link 40 so that the television display unit 30 selectively displays television signals output by the television accessory unit 32 in a format perceivable by at least one individual located adjacent the television display unit 30.

The second category of signals transmitted from the input unit 34 to the signal separator interface 54 are those signals intended to control or operate the local computer 52. Upon receipt of a second category signal, the signal separator interface 54 outputs such second category signal to the local computer 52 via a communication link 58. The second category signals can be the normal computer control signals plus a special remote logon command that can either be a set of keyboard strokes or a special function key provided on the input unit 34 for this purpose. Upon receipt of the remote logon command, the operating system software of the local computer 52 outputs signals to the television interface 50 which formats such signals as television signals. The television interface 50 then transmits the television signals to the television display unit 30.

to cause the screen (or at least some portion thereof) of the television display unit 30 to appear as a normal personal computer screen selected by the individual (e.g. Windows 95, Windows 3.1, Macintosh, OS/2, NT95 or any other common PC screen used by the individual).

In addition, the receipt of the remote logon command causes the operating system software of the local computer 52 to output the remote logon command to the telephone network controller 14 via the communication links 58 and 16a. The telephone network controller 14 transmits the remote logon command to the remote system controller 26 via the communication link 27a. The remote system controller 26 receives the remote logon command, and in response thereto, the remote system controller 26 checks the remote logon command for validity and allows connection to at least one of the remote computer units 24 if the remote logon command is valid and prohibits connection of the remote portion 22 to the local portion 12 of the split personal computer system 10 if the particular remote logon command is not valid. The validity of the remote logon command can be determined in a manner recited in U.S. Patent No. 4,528,643, issued to Charles C. Freeny on July 9, 1985, which disclosure is hereby incorporated herein by reference.

Once the local portion 12 of the split personal computer system 10 and the remote portion 22 of the split personal computer system 10 are connected to permit communication therebetween, the remote portion 22 of the split personal computer system 10 provides video signals to the local portion 12 of the split

personal computer system 10 via the sequential communication links 27b and 20a, and data signals to the local portion 12 of the split personal computer system 10 via the sequential communication links 27a and 16a. The video and data signals transmitted from the remote portion 22 of the split personal computer system 10 are received by the signal separator interface 54 and then forwarded to the local computer 52 via the communication link 58. The local computer 52 receives the video and data signals, and then the operating system of the local computer 52 transmits the video and data signals to the television interface 50 via a communication link 60. The television interface 50 then formats the video and data signals into audio television signals, video television signals or audio and video television signals. The television signals are then transmitted to the television display unit 30 so that the television signals are perceivable by the individual located adjacent the television display unit 30.

The third category of signals provided from the input unit 34 to the signal separator interface 54 can be those associated with mouse signals (point and click signals) or keyboard typing signals or any other suitable data input signals. The third category of signals are transmitted from the signal separator interface 54 to at least one of the remote computer units 24 via the sequential communication links 16a, 27a and 28a. The remote computer unit 24a receives such transmitted signals and processes same with at least one of the application computer programs to generate output signals including video and data signals. The video signals are transmitted

from the remote computer unit 24a to the signal separator interface 54 of the television accessory unit 32 via the sequential communication links 28a, 27b and 20a. The data signals are transmitted from the remote computer unit 24a to the signal separator interface 54 of the television accessory unit 32 via the sequential communication links 28a, 27a and 16a.

The signal separator interface 54 receives the video and data signals and in response thereto, the signal separator interface 54 transmits such video and data signals to the local computer 52 via the communication link 58. The local computer 52 receives the video and data signals and transmits at least some of such video and data signals to the television display unit 30 via the television interface 50 to update the screen. Some of the data signals received by the local computer 52 can be directed to the output unit 36 to provide tangible and/or intangible output of the data signals.

The above stated process is then repeated a plurality of times so that the local and remote portions 12 and 22 of the split personal computer system 10 cooperate to provide the illusion of a single complete personal computer system to the individual located at the local portion 12 of the split personal computer system 10. That is, the remote portion 22 of the split personal computer system 10 provides the individual utilizing the local portion 12 of the split personal computer system 10 with access to the application software packages stored on the remote portion 22 of the split personal computer system 10, and data stored on the remote portion 22 of the split personal computer system 10

on behalf of the individual in conjunction with previous usage. The local portion 12 of the split personal computer system 10 provides the individual with visual feedback via the television display unit 30, and input and output capabilities via the input unit 34 and the output unit 36.

Shown in Figure 3 is a schematic diagram of the remote portion 22 of the split personal computer system 10. The remote computer units 24 are substantially identical in construction and function. Thus, only the remote computer unit 24a will be described herein for purposes of clarity. However, like components on the remote computer units 24a and 24b will be designated with the same numeral, but different alphabetic suffixes "a" and "b", respectively.

The remote computer unit 24a is provided with a permanent memory 70a, a central processing unit 72a and a random access memory (RAM) 74a. The central processing unit 72a can communicate with the permanent memory 70a and the random access memory 74a via communication links 76a and 78a in a manner well known in the art. The remote computer units 24 can be provided with operating system software stored either on the permanent memory 70 or the random access memory 74 to permit more than one individual to simultaneously utilize or share each of the permanent memory 70, central processing unit 72, and/or random access memory 74 on the remote computer units 24 to conserve resources. The remote computer units 24 can be loaded with any or all of the application software currently available, such as

WordPerfect®, Lotus 1,2,3®, Excel®, MS Word® and Access® brand software, for example.

Although more than one local portion 12 of the split personal computer system 10 can communicate with the remote portion 22 of the split personal computer system 10 simultaneously, the probability that all of the local portions 12 of the split personal computer system 10 will utilize the remote portion 22 of the split personal computer system 10 simultaneously is slim. To further conserve resources, the remote portion 22 of the split personal computer system 10 desirably has less remote computer units 24 than the number of local portions 12 of the split personal computer system 10 which have access thereto.

In one embodiment, a method for utilizing the split personal computer system 10 includes the step of inputting respective data signals into at least two of the television accessory units 32 of the local portions 12 of the split personal computer system 10. The television accessory units 32, then output the respective data signals to the remote portion 22 of the split personal computer system 10 via respective communication links 16a and 16b, the telephone network controller 14 and the communication link 27a. The remote portion 22 of the split personal computer system 10 receives the respective data signals. The respective data signals are then forwarded to at least one of the remote computer units 24 which then processes the respective data signals with at least one application program to generate output signals.

The output signals are then output by the remote portion 22 of the split personal computer system 10

to the television accessory units 32 via the communication link 27b, the television network controller 18, and the communication links 20a and 20b such that output signals are received by the television accessory unit 32 which correspond to the data signals input to that respective television accessory unit 32. Each television accessory unit 32 outputs the respective output signals received from the remote portion 22 of the split personal computer system 10 to the television display unit 30 as television signals. And, each television display unit 30 receives the television signals output by the respective television accessory units 32 and then outputs the television signals in a format perceivable by at least one individual located near the television display unit 30.

Although only one cycle of the method is described herein, it should be understood that such method can be repeated any number of times so that respective individuals are simultaneously provided with the illusion of operating a complete personal computer system.

Shown in Figure 4 is the television accessory unit 32 disposed on top of the television display unit 30. As shown, the television accessory unit 32 having the portable housing 55 can be in the form of a cable television interface box interconnecting the television display unit 30 to a cable television connection 80. The cable television connection 80 is desirably interfaced with both the telephone network controller 14 and the television network controller 18 so that telephone, internet and television access, for example, is provided from the cable television

connection 80 currently provided in suitable locations such as homes, hotels and businesses.

Although the present invention has been shown and described herein as operating with the television display unit 30, it should be understood that the present invention should not be limited to including, the television display unit 30. For example, a monitor or other type of output unit can be utilized in place of the television display unit 30.

Changes may be made in the construction and the operation of the various components, elements and assemblies described herein and changes may be made in the steps or the sequence of steps of the methods described herein without departing from the spirit and scope of the invention as defined in the following claims.